

THE AMERICAN JOURNAL OF PHARMACY

JUNE, 1897.

THE ROOT OF PHYTOLACCA DECANDRA.

A Contribution to the Knowledge of its Chemical Constituents.

PART II.

BY GEORGE B. FRANKFORTER AND FRANCIS RAMALEY.

This plant was recorded as emetic by Griffith,¹ in 1833, and as cathartic by Allen² the following year. The latter writer remarks that it is difficult to administer without producing emesis, and that large doses are followed by narcotic symptoms.

The earliest record of chemical investigation, found by the writers, that would seem to be of present interest, is by C. Reichel.³ He studied the pharmacology, therapeutical properties and chemical composition of the root of *Phytolacca drastica*, a Chilean species, but related to our own. Of organic substances there were found: resin, wax, coloring matter, proteids and malates.

E. Donelly,⁴ in 1844, published an analysis of *Phytolacca decandra*. This is interesting because, it is the first analysis of which any record could be found. The following is a summary of the results:

¹Griffith, R. E. On the Vegetable Emetics of the United States. JOUR. PHILA. COLL. OF PHARM., 4, 276, 1833.

²Allen, John C. Remarks on the Vegetable Cathartics of the United States. JOUR. PHILA. COLL. OF PHARM., 5, 205, 1834.

³Reichel, C. *Phytolacca Drastica*. Chem. Centrbl., 681, 1836.

⁴Donelly, E. On *Phytolacca Decandra*. AM. JOUR. PHARM., 9, 165, 1844.

Woody fibre	66.500
Starch	20.000
Tannin, gum and saccharine matter	5.375
Gum resin	2.625
Potassa	2.000
Iron875
Fixed oil500
Silica and carbonaceous matter	1.000
	<hr/> 98.875

In the *Chem. Centrbl.* for 1849 a short note states that, according to Landerer,⁵ all parts of the *Phytolacca decandra*, when fresh, have an emetic and purgative effect, which disappears on cooking. In Greece the young shoots and leaves are eaten as greens. They are employed as a vermifuge.

An account by C. H. Cressler⁶ records the fact that the inhalation of the powdered root produces soreness of the throat and chest, severe coughing and inflammation of the eyes.

Terreil,⁷ in 1880, described phytolaccic acid which he obtained from the fruit of *P. decandra* and *P. Kaempferi*. The acid is uncrySTALLIZABLE and dries without alteration. It forms a translucent, gummy syrup, yellow-brown in color, not deliquescent; easily soluble in water and alcohol, scarcely in ether. The watery solution has an acid reaction. It can be heated to boiling without change, but on addition of hydrochloric or sulphuric acid, is converted into a gelatinous mass, easily soluble in weak alkalies, ammonia, etc.

Balland examined the berries of *P. dioica*. He determined the percentages of water, wax, sugar, gum, etc. There was 26 per cent. of an organic undetermined acid, which was thought to be similar to the phytolaccic acid of Terreil.

Wm. F. Pape⁸ found in the root of *P. decandra* a dark-brown fixed oil, tannin, gum, starch, sugar, resin, organic acid and coloring matter. The ash contained potassium, iron, calcium, chlorine, sulphuric and phosphoric acids. Crystals of potassium nitrate were obtained from an alcoholic extract of the root. Tests with iodo-hydrargyrate

⁵Landerer. (Quoted in an editorial note.) *Phytolacca Decandra* als Heilmittel. *Chem. Centrbl.*, 831, 1849.

⁶Cressler, Chas. H. Poke Root. Poisonous effects from inhalation of the powder. *AM. JOUR. PHARM.*, 47, 196, 1875.

⁷Terreil, A. *Comptes rendus*, 91, 856-58, 1880.

⁸Pape, Wm. F. On *Phytolaccæ Radix*. *AM. JOUR. PHARM.*, 53, 597, 1881.

of potassium and with iodine solutions indicated the probable presence of an alkaloid.

W. Cramer⁹ found the juice of the berries to contain gum, sugar, malic acid and coloring matters.

An elaborate investigation of the root was made by Edmond Preston, Jr.¹⁰ He found traces of hydrochloric, phosphoric and sulphuric acids, with 5.5 per cent. of potassium hydroxide. A small amount of free acid was found; this had the characteristic odor of the root; its potassium salt was decomposed with effervescence on treatment with acids. From the purified aqueous extract of the root there was obtained a small quantity of nearly white crystals, which in solution gave precipitates with the usual alkaloidal reagents. The crystals were entirely dissipated when heated on platinum foil, and when treated with strong mineral acids simply dissolved, giving no characteristic color test. "An alcoholic solution of the crystals neutralized with dilute hydrochloric acid on concentration yielded nearly colorless acicular crystals, moderately soluble in alcohol, quite soluble in water and possessing a strong, acrid taste." It was concluded that the crystals were those of an alkaloid and of its hydrochloride. For this alkaloid the name "phytolaccine" was proposed.

Coscera¹¹ found that tender shoots and leaves show slight, and the roots more, toxic qualities. The same parts of the plant, at time of fruiting, have a marked emetic and purgative action. He obtained what he considered a glucoside by the following means: The root was extracted by 90 per cent. alcohol; the filtrate, on cooling, showed the substance as a white powder, insoluble in ether, scarcely in absolute alcohol, somewhat in 50 per cent. alcohol, readily in water. It was also soluble in dilute acids. The substance reduced alkaline copper sulphate only after heating with dilute sulphuric acid.

In an alcoholic extract of the root "a few crystals" were found by Partee,¹² but these were not investigated. He also obtained some

⁹Cramer, Walter. *Phytolacca Baccæ*. AM. JOUR. PHARM., 53, 598, 1881.

¹⁰Preston, Edmond, Jr. The Root of *Phytolacca Decandra*, Linné. AM. JOUR. PHARM., 56, 567, 1884.

¹¹Coscera, N. Beiträge zur chemische-toxische-Kentniss von *Phytolacca Decandra*. L. Review in *Chem. Centrbl.*, pp. 576, 643, 808, 1887.

¹²Partee, Wm. A. Analysis of Poke Root. AM. JOUR. PHARM., 60, 123, 1888.

acicular crystals from the absolute alcohol extract. The residue from the ether extract contained a wax, melting at 109° . The other substances found were: gum, glucose and tannin, with indications of a possible glucoside.

The investigations of Haverland¹³ were directed to the fruit of *Phytolacca*. This investigator found phytolaccic acid, with small quantities of acetic, citric and tartaric acids. Phytolaccin, which he found in seeds on analysis, was found to be a non-nitrogenous body related to the tannins, and containing 65.95 per cent. of carbon, 28.15 per cent. of hydrogen, and 5.9 per cent. of oxygen.

A substance obtained from the root, and suggested as being a saponin, was described by Trimble¹⁴ in 1893. It was precipitated by water from the alcoholic percolate. Solutions frothed on shaking. The taste was slightly bitter and acid. Analysis indicated the formula $C_{54}H_{82}O_{23}$.

The latest contribution to a knowledge of the chemical properties of the root is by one¹⁵ of the present authors. A complete quantitative analysis of the ash was made, and the gases given off during destructive distillation of the root were investigated. As the results have been so lately published it is unnecessary to summarize them here.

In the foregoing account reference has been made to investigations on the fruit of *Phytolacca* only when it seemed that these might throw light upon the constituents of the root. It will be sufficient here to mention the investigations of Bischoff¹⁶ and Macagno,¹⁷ which were directed to the coloring matter of the fruit, and those of Claussen¹⁸ on the active principle of the seed; and of Eberhardt,¹⁹ who examined the root but made no quantitative analysis and whose work was mostly corroborative of previous results.

¹³Haverland, Franz. Beiträge zur Kenntniss der in den Früchten von *Phytolacca Decandra* enthaltenen Bestandtheile. Inaug. Dissertation. Erlangen. 1892.

¹⁴Trimble, Henry. A Proximate Principle from *Phytolacca Decandra*. *AM. JOUR. PHARM.*, 65, 273, 1893.

¹⁵Frankforter, Geo. B. A Chemical Study of *Phytolacca Decandra*. *AM. JOUR. PHARM.*, 69, 134, 1897.

¹⁶Bischoff, H. Inaug. Dissertation. Tübingen, 1876. Ueber den Farbstoffe, etc. *Landwirthsch. Versuchsst.*, 23, 456-61, 1878.

¹⁷Macagno, J. In atti R. Stazione chimico-agraria di Palermo, 47, 1886. *Chem. Centrbl.*, 123, 1886.

¹⁸Claussen. In Husemann-Hilger's "Pflanzenstoffe," p. 531, 1882.

¹⁹Eberhardt, E. G. Chemical Examination of Poke Root. *Lilly's Bulletin*, No. 23, p. 3. 1893.

It is to be noted that the "phytolaccin" of Claussen was described five years before the "phytolaccine" of Preston. Should the latter's discovery be confirmed, it would be necessary to rename the substance described by him.

The authors desire, at this point, to express their thanks to Mr. C. P. Berkey, instructor in mineralogy at this University, for his careful examination of the sugar crystals, and to Dr. Wm. Trelease and Mr. John S. Wright, for assistance in securing the literature on the subject.

RECORD OF INVESTIGATIONS.

The work of investigation was begun in October, 1895, and has been carried on more or less continuously since that time. Two proximate analyses were made. Besides these, various quantities of the root were extracted in different ways for certain of the constituents. Three partial analyses were also made. Air-dried material was used. This was obtained from three different wholesale houses and personally garbeled before grinding. The latter process is an extremely unpleasant task when done with a hand-mill, for the inhalation of the dust produces, as has been noted in the historical summary, most severe inflammation of the membranes of the nose and throat.

Most of the substances previously reported were found in the present investigation. Preston's phytolaccine was, however, not obtained, nor could the presence of tannin or of chlorides be shown. The crystallized sugar which was found is undoubtedly the "glucoside" of Coscera and the "few crystals" of Partee. The "acicular crystals" of the latter were probably potassium nitrate. The large amount of potassium in the root is easily recognized. Its characteristic flame is observed when a splinter of the root is held in the Bunsen flame.

The percentages extracted by the various solvents were as follows :

Petroleum ether	627
Sulphuric ether	100
Absolute alcohol	11 734
Cold water	25 232
Dilute sulphuric acid	38 386
Dilute alkali	4 744
Removed by potassium hypobromite	3 206
Residue of cellulose	16 378

100 407

Great care was taken that the extraction by each solvent should be complete. The petroleum ether extract was of light amber tint; the ether extract was of a burnt sienna color, and probably contained little else than coloring matter. All the other extracts were of about the same rich reddish-brown tinge. The water extract showed an acid reaction.

A summary of the analyses may be given in tabulated form. When two or more determinations have been made the results have been averaged:

Oil and wax	627
Resin	1'010
Non-reducing sugar calculated as sucrose	9'457
Reducing sugar calculated as dextrose	435
Proteids	1'944
Amido-compounds (calculated as asparagin)	1'634
Free acid calculated as formic	360
Combined organic acid calculated as potassium formate	1'891
Starch	11'677
Calcium oxalate	6'225
Nitrates calculated as potassium nitrate	2'408
Cellulose	16'378
Lignin, etc.	3'206
Gum, coloring matter, ash, moisture and undetermined	42'748
	<hr/>
	100 000

The oil is non-volatile, of a brownish color and readily saponifiable with cold, fixed alkalis. The wax is light yellow in color. It was not studied. The resin found in the alcohol extract was dark brown in color, and of a very bitter taste.

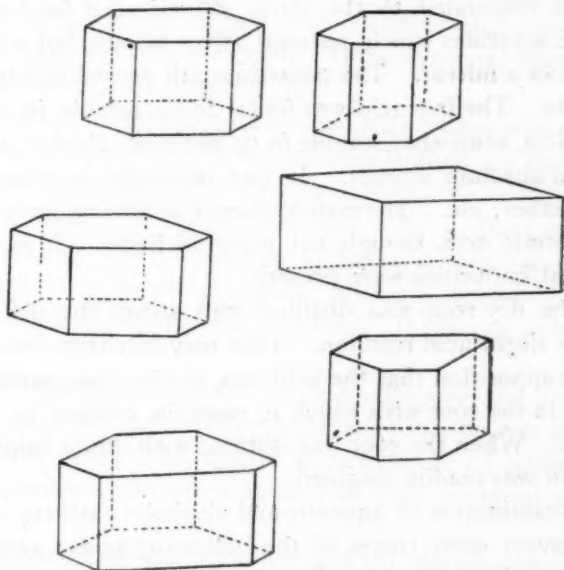
The sugar can only be crystallized with great difficulty and best from absolute alcohol, as the various other substances soluble in alcohols of less concentration seem to interfere with the crystallization. In one analysis 2.6 per cent. of crystallized sugar was obtained. It can generally be had only in much smaller quantities.

This crystallized sugar is completely soluble in large excess of hot absolute alcohol. From such a solution it is sometimes obtained in a very fine crystalline powder. From thick, syrupy water solutions prismatic crystals can, with difficulty, be obtained. These crystals are clear, colorless, transparent prisms, belonging to the orthorhombic system. Their most common forms are represented in the accompanying figure. The longer lateral axis is in nearly all cases cut by pinnacoid planes, so that the crystals, when seen from

above, are almost perfectly hexagonal in outline. The lengths of the lateral axes are 1 and $\cdot 767$. Since only prismatic crystals were found, the length of the vertical axis could not be determined.

The commonest forms are shown in the accompanying figure.

The sugar began to melt at 146° , and was completely melted at 153° . It boiled at from 180° to 185° , turning brown. Warmed with sodium hydroxid solution, it turned yellow. When warmed with concentrated sulphuric acid, charring did not take place, though there was a brown coloration.



Sugar Crystals from *Phytolacca Decandra*.

Polarization of a clear solution showed 87.6 per cent. sucrose. The reaction with Fehling's solution indicated 4.4 per cent. anhydrous dextrose. Polarization was not affected by warming the solution nor by allowing it to stand in the tube for some hours.

Proteids were determined in the alkali extract by Kjeldahl's method.

Amido-compounds were determined by the use of potassium hypobromite, the nitrogen evolved measured and calculated to asparagin.

The water extract of the root had a decidedly acid reaction. Two

grammes of the drug were extracted with 200 c.c. of cold water, and the filtered solution titrated against a standard alkali solution. By this means the percentage of free acid, calculated as formic acid, was determined.

On distilling a 90 per cent. alcohol extract of the root a small quantity of the acid was obtained. This was exactly neutralized with fixed alkali and brought to dryness on the water bath. When the alkali was added the solution became light yellowish in color. The dry salt was distilled with phosphoric acid, to obtain the organic acid in the free state. It distilled between 98° and 100° .

The acid responded to the ferric chloride test for formic acid. Neutralized solutions slowly reduced silver nitrate, but without the appearance of a mirror. The potassium salt crystallized in beautiful stellate tufts. The free acid was found to be soluble in water and weak alcohols, somewhat soluble in 95 per cent. alcohol, and almost insoluble in absolute alcohol. It was insoluble in ether, benzene, petroleum ether, etc. The taste and smell of the acid were similar to those of formic acid, though not quite identical. It is, however, possible that impurities were present.

When the dry root was distilled with steam the distillate had only a very slight acid reaction. This may, perhaps, be accounted for on the supposition that the acid was, in this case, neutralized by carbonates in the root with which it came in contact in a not too dilute form. When the root was distilled with dilute sulphuric acid the free acid was readily obtained.

Careful examination of aqueous and alcoholic extracts of the root failed to reveal even traces of the following acids: acetic, citric, malic, tartaric, benzoic and salicylic. The first four named acids were tested for with particular care, since they have been found by various investigators in the fruit of the same plant. Although calcium oxalate was found to the extent of 6 per cent., no free oxalic acid or soluble oxalates were discovered. Phytolaccic acid may or may not be present. From the descriptions given by its discoverer it would appear that the acid he described was by no means pure.

It has seemed proper to calculate the acids in combination as potassium salts, since such a large amount of potassium is present. It is certainly reasonable to suppose that the salts exist as such in the root.

A portion of the dilute sulphuric acid extract was heated in a closed tube at 120°. The percentage of glucose was determined, and from this the amount of starch calculated.

Potassium nitrate crystallized from the alcohol extracts. Under the most favorable conditions a little less than 1 per cent. was obtained by careful crystallization.

After extracting the root with 90 per cent. and with 60 per cent. alcohol, an extract made with cold water was, after drying, 6.6 per cent. by weight of the dry root. The extract has a strong cathartic action, this property being tested by two persons. It is to be noted that the 95 per cent. and 60 per cent. extracts also possessed the same property, but to a less extent. These extracts, when strongly heated, emit an odor of popping corn.

A quantity of the root, first exhausted with water, was percolated with 95 per cent. alcohol. The tinctures frothed on boiling. On cooling there was deposited a whitish powder, the particles usually somewhat spherical in shape, each one with a short appendage. This substance is nearly insoluble in water, but rather soluble in alcohol. This may be the proximate principle described by Trimble. Only a small quantity was obtained. It has not been further examined.

Extended investigations were made to establish the presence of an alkaloid or glucoside. Although the examination was quite thorough, no substances of this nature were isolated. Further investigations will, however, be made as soon as fresh material is obtainable.

Tests were made for the alkaloids and the glucosides commonly occurring in plants, but with negative results in every case. Various methods of extraction were employed; *e. g.*, treatment of the aqueous extract with alcohol and with methyl and amyl alcohol; also with acidulated water and acidulated alcohols.

In purified aqueous extracts, precipitates were thrown down with some of the usual alkaloidal reagents, but not with picric acid or phosphomolybdic acid.

Attempts were made at every step to obtain the substance in crystalline form, but always without success. Purified extracts, acid and alkaline, were shaken with various solvents, as ethyl acetate, chloroform, ether, petroleum ether, and benzol. In many cases tests applied to the dissolved residues indicated the presence of an

alkaloid from both the acid and alkaline solutions. From this we are led to infer that the alkaloid—if one and only one be present—exists in the root as a salt, and also in its basic condition.

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.

YERBA DEL POLLO.

BY ALFONSO HERRERA, of Mexico.

Several plants of the family Commelinaceæ are known in Mexico by this name, and are to be found in cold as well as in warm and temperate regions. They grow on the sandy banks of rivers and brooks, and flourish from July until September.

Hernandez calls them Matlaliztic prima, secunda, texcocana, terciã, asphodelea, and coapatli. According to this author, the Aztecs used this plant to cure fevers, headaches, tumors and hemorrhages, and to give relief in child-birth. The hemostatic properties of the Yerba del Pollo were therefore known to the Indians, but this precious plant was forgotten, together with many other good and useful products of the conquered country.

Almost three centuries later, Alzate made known to his countrymen the remarkable activity of this plant in stopping the blood from wounds, but his efforts were useless, for the plant remained unnoticed until 1863, at which time we began to read about it in the works of Hernandez and Alzate; we repeated the experiments of these illustrious authors, induced physicians to use it, and began to seek for its active principle.

A short time afterwards, Mr. Touraine read the work of Padre Alzate, and, on trying the efficacy of the drug as a hemostatic, he met with great success; the results of his experiments and investigations he laid before the *Academia de Medicina de Mexico*, on February 21, 1866; the paper was published in the *Gaceta Médica*, Vol. II. He asserted that nobody had studied the plant since Alzate's time, and he suggested for it the name *Tradescantia erecta*; the president of the Academy, Dr. Jimenez, observed that we had attracted his attention to the subject in the year 1863, and its extract had been applied to a number of patients with success.

Synonyms.—*Commelina tuberosa*, Linn. *Sp. Pl.* Ed. 1, page 41; C. B. Clarke, in D. C. *Monogr. Phanerog.* III, page 149; Andr. *Bot. Rep.*, t. 399; Schnizl *Iconogr.*, t. 48. *Commelina parviflora*, Reichl.

Fol. Exot. II, p. 17, t. 142, non Link. *Commelina undulata*, Lodd.
Bot. Cab., t. 1553, non R. Br.

Matlaliztic, Coapatli, Zoyol, Xochitl, Yerba del Pollo, Rosilla.

Habitat.—Valle de México, Orizaba.

Analysis.—The juice obtained by a simple pressure of the fresh plant has an acid reaction towards litmus paper. We have obtained some perfectly neutral liquid of a peculiar odor by placing the juice in a retort and distilling by means of a water bath, then adding to the bath calcium chloride in several portions, to increase the boiling temperature, and collecting the different fractions which came over. When but little juice remained in the retort its odor was found to have changed, and it possessed a strongly acid reaction; when this acid liquid was neutralized with bases, salts were obtained which were found to be acetates.

Another portion of the juice was heated to 80°, when a precipitate was formed which was found to be vegetable albumin. The liquid, filtered from the albumin, was concentrated to half its volume and treated with alcohol 33° Cartier, when a cheesy precipitate separated, which was found to be of an albuminoid nature. The residual liquid, after separation of this precipitate, was concentrated anew to remove alcohol, reduced to a small volume, and set aside for a while; potassium chloride separated as a result of this treatment, and on further concentration, more of the same salt separated, mixed with extractive matter.

An extract of the juice was obtained by evaporating the latter on a water-bath. It was partly soluble in water; when treated in the same manner as the juice, similar compounds were obtained. A small amount of ammonium acetate was also found in the extract, due, no doubt, to the pre-existence of acetic acid in the plant, and to the formation of ammonia from the proteid principle on the application of heat.

We obtained also a product neutral to litmus paper—smelling like the liquid produced by distilling the juice—by distilling the dry plant with simple water. If distilled with lime it afforded a liquid smelling like the foregoing, but reacting alkaline towards litmus paper. On saturating this alkaline liquid with acid an ammonium salt was obtained.

Ammonia may be obtained even in an ordinary temperature by wetting the powdered plant and mixing it with lime or the carbon-

ate of potassium or sodium. The dried plant also yielded chlorophyll when treated with ether.

In short, the Yerba del Pollo contains the following principles:

In the juice, acetic acid.

In the extract, ammonium acetate, potassium chloride, albuminoids, vegetable albumin, chlorophyll, extractive and cellulose.

In his paper about this plant, Padre Alzate owned that he believed the hemostatic influence of a mucilaginous plant could never be accounted for. Mr. Touraine proposed to seek and isolate the active principle. Some four years ago we determined to solve the problem, and undertook a series of experiments, that were too long to enumerate, since there are no fixed rules for arriving at an absolutely correct result, and determining certainly which one of these principles is the active one.

We can assert from the present moment, with regard to the extract, that it is not the extractive, chlorophyll, ammonium acetate or vegetable albumin. There remain the potassium chloride and the proteid principle, though it may be questioned if either of these has any hemostatic properties. We have seen, however, that the wet powder of the plant and the solution of the extract are most active hemostatics, and the analysis points out no principle worthy of notice in this connection but these two, so that it seems rational to attribute the hemostatic properties to them.

If it is the proteid principle and potassium chloride which act, in what manner is it? The question is rather difficult to solve, since proteid principles are of a very complex nature, and their molecules stand in such unstable equilibrium that the slightest modification in the conditions of their existence suffices to decompose them. Such are the albuminoid principles of *Commelina*, of blood, and of animal cells. We have observed in the analytical part with regard to the *Commelina*, that an elevation of temperature, the presence of alkali hydrates or their carbonates suffice to alter it, heat transforms it into an insoluble principle and a small quantity of ammonium acetate.

We need say nothing about blood, for its composition and alterability are perfectly well known, except to make the following quotation from Mialhe: "The three principal liquids of the animal economy, chyle, lymph and blood, are, when normal, alkaline."

With regard to contractibility of capillary vessels, we will quote

from Béclard's Physiology: "Pouring cold water on the natatory membrane of a frog, the calibre of its capillary vessels diminishes to a half or three-quarters of its normal size at least. Common salt produces the same effect. This contractibility can also be made evident by acid or diluted alkaline solutions."

Taking all these facts into consideration, we will hazard a theory which, though in no way invulnerable, might perhaps help us to explain a physiological fact. Applying on a broken vessel the powder of the plant, in a cataplasm, or a concentrated solution of the extract, the proteid principle of the herb mixed with the blood whose alkali reacts upon the former and affords a separation of ammonia; this reacts upon the vessels, irritating their tissue and contracting them, as Béclard observed; for it constitutes a very dilute alkaline solution, and has hemostatic properties sufficient to produce a complete obliteration of the vessels.

Mr. Touraine affirms to have seen this contraction of the vessels in several physiological experiments, and we have made similar observations, although not quite so certain of the results.

When we used the powder of the plant or the solution of the extract, the potassium chloride added its own action to that of the ammonia, and substituted the sodium chloride, whose action has been observed by Béclard.

Internally, *Commelina* cures metrorrhagia, which fact might be explained by the aforesaid chemical reactions; the proteid principle enters the current of the circulation. We will copy Hernandez according to the text, for it is both elegant and clear, and leaves no doubt about the latter application we have mentioned. With regard to the Matlaliztic texcocana, he says: "*Radix discutit tumores praeter naturam a causa calida ortos, tusa, atque applicata, aut devorata, duarum drachmarum mensura, humore impetum coërcet, sanguinis redundantiam reprimat destumque refrigerat.*"

Therapeutic Uses.—The most distinguished physicians of Mexico use the extract of *Commelina* as a kind of a hemostatic in the treatment of metrorrhagia and hemoptysis, administering it in pills in the latter case, and in injections in the former. They employ it, too, as an active remedy against leucorrhœa, and as a general hemostatic in capillary hemorrhage.

Posology—The extract is to be given in pills of 1 or 2 grains, which shall be taken to the number of twenty-four to forty-eight a

day. Injections are made by adding from 1 drachm to 1 ounce to a pound of water. In wounds, cataplasms may be made from the powder of the plant, or a concentrated solution of the extract may be applied by means of lint.

We copy from the proceedings of the *Academia de Medicina de Mexico*, session of February 21, 1866: "Dr. Lucia has repeatedly used *Commelina* to cure metrorrhagia, and always with success. Dr. Villagran has also used the extract in injections, the dose being a drachm to a pound of water, to cure metrorrhagia, and has always obtained the most satisfactory results. He has lately used it in an instance of cancer in the stomach, and has attained most unexpected success. Dr. L. Jimenez has also been fortunate in the use of injections of extract in two cases of uterine cancer, and in leucorrhœa accompanied with chlorosis. Dr. Miguel Jimenez has used the extract since the year 1864, and has made many experiments with the plant which prove its activity as a hemostatic. The greatest results are obtained according to this physician by the dose of a drachm in a pound of water. Its utility is incontestable in uterine cancer, but it is also useful in other forms of hemorrhage. Dr. M. Jimenez remembers an instance of hemoptysis in which he was surprised by the good results obtained with this medicine, for it prolonged the life of the patient in an unexpected manner. He has also used it to cure hemorrhoidal flux with success. He has failed, however, in some other cases of hemoptysis, on account, perhaps, of the patient vomiting, which prevented the action of the remedy."

RIEGLER'S METHOD FOR ESTIMATING SUGAR IN URINE.

BY HENRY C. C. MAISCH, PH.G., PH.D.

This method, as described on p. 228 of the *American Druggist*, estimates the amount of sugar contained in urine indirectly by means of Fehling's solution. The reaction on which this depends is the liberation of nitrogen when Fehling's solution is brought in contact with phenylhydrazine hydrochloride.

The manner of applying this test is to boil the urine and Fehling's solution, and, after connecting the apparatus, the phenylhydrazine solution is added. In other words, the balance of the Fehling's

solution remaining after the reduction with urine, reacts with the phenylhydrazine liberating the nitrogen.

In theory, and then only with pure solutions, this method for the estimation of sugar is good; but I do not consider the method of any great utility with urine, basing my opinion entirely on theoretical grounds and experiments carried on with Fehling's solution itself. In handling a solution as complex as the urine, we must not forget that there are a number of compounds present, or might be present, which have more or less of a reducing action on Fehling's solution. Bodies of this character are uric acid, creatinine, allantoin, nuclealbumin, lactic acid and biliary coloring matters, consequently, all probable constituents of urine. These compounds, however, are usually present in such small quantities that their presence becomes of especial importance where the percentage of sugar is small, and just in a case of this kind it is of the utmost importance to have a method which can be used in all cases without fearing that by the action of the reagent on other constituents of the urine a similar reaction might be brought about. This, to my mind, is the most serious objection to this method—in fact, to all the methods using the copper salts.

In my laboratory practice I have repeatedly proven to my own mind the statement just made in reference to Fehling's solution. I recall one case especially. The urine was furnished me with the statement that it showed Fehling's reaction rather strongly. It was from a lady looking forward to an early confinement, and a careful examination, with the elimination of all possible errors, was absolutely necessary. I found that the Fehling's test and the Boettger's test were both strongly reduced; but on subjecting the urine to the action of yeast, no fermentation took place and no difference in specific gravity, as by the Roberts method, was observed. Making examinations daily, I found that in about three or four days this apparent sugar reaction had entirely disappeared. This lady had been suffering from headache and had used one of the many headache remedies found in the market at the present time. This "sugar" reaction was very likely caused by one of the conjugate glycuronic acids.

At the present time I do not depend entirely on Fehling's test or Boettger's test, but run through the principal chemical tests, and in cases of uncertainty I use the Roberts differential specific gravity method for the quantitative estimation of glucose.

One of the reactions on which I depend to some extent is that of Rübner, and also its modification by Penzoldt; but even here the question will arise whether or not the same reaction is given by other compounds. Rübner uses 3 grammes lead acetate to 10 c.c. urine, filters, and adds ammonia water until a permanent precipitate is formed and then warms to about 80° C. The presence of sugar is indicated by the precipitate becoming pink or red, depending on the percentage. Penzoldt uses the subacetate of lead in place of the neutral acetate, and proceeds as in the original reaction.

ON THE OCCURRENCE OF STRONTIUM IN PLANTS.

BY HENRY TRIMBLE.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 166.

Some months ago a number of barks were received from Dr. H. N. Ridley, of the Botanic Gardens at Singapore. They were chiefly barks representing the several species of the genus *Castanopsis* in that locality, and two species of oaks. The primary object in examining these barks was to learn the character of their tannins, but that is reserved for a later article.

In examining the ash of these barks a slight precipitate was noticed for strontium in the first one; this was passed by as being a small quantity of calcium, which was the most abundant constituent in the ash. But the ash of other samples also yielded precipitates indicating strontium, some of them in such quantity that the precipitate was washed thoroughly, treated with a few drops of concentrated hydrochloric acid, and the flame test applied; the result in every case was a distinct strontium flame. The strontium precipitate was gotten by three methods, viz.: precipitating with very dilute sulphuric acid, precipitating with an alkaline solution of potassium chromate, and, finally, by precipitating with solution of calcium sulphate.

The samples of *Castanopsis* were from the following: *C. Wallichiana*, *C. Curtisii* (two samples), *C. Javanica*, and *C. Hulettii*. The oak samples were from *Quercus hystrix* and *Q. discocarpa*. The *Quercus hystrix* was probably the richest in strontium of all the samples. None of them contained more than traces of the strontium salt. A sample of our American *Castanopsis*, *C. chrysophylla*,

from California, failed to show a trace of strontium, and yielded only about one-half the amount of ash that was obtained from the East India samples. One sample of *Rhizophora*, from a number recently received from Singapore, also indicated the presence of strontium. A letter from Dr. Ridley states that little, if any, strontium occurs in the soil of Singapore.

It is such a natural conclusion that strontium may replace calcium in plants, that the foregoing statement concerning its existence in plants may appear almost unnecessary. It was found, however, that most authors, in speaking of the ash constituents of plants, were either silent on the subject of strontium, or else referred to the one case where it has been found in seaweed. Dr. Emil Wolff, in his *Aschen-Analysen*, among some thousands of results, does not appear to mention strontium, not even among the seaweeds. Roscoe & Schorlemmer (*Treatise of Chemistry*, Vol. II, Part I, p. 213) state: "Strontium has also been found in sea water and in the ashes of *Fucus vesiculosus*."

Ebermayer (*Physiologische Chemie der Pflanzen*, p. 715) mentions strontium with some other metals as occurring in traces in a few plants, but he gives no definite information. Sachs (*Lectures on the Physiology of Plants*, p. 383) merely states that strontium may replace calcium in the fungi. Sorauer (*A Popular Treatise on the Physiology of Plants*, p. 36) calls attention to the fact that strontium has been discovered in several seaweeds. Goodale (*Physiological Botany*, p. 256) mentions strontium with some other metals as occurring in *Fucus*.

Messrs. Kebler and LaWall, in the May number of this JOURNAL, p. 244, pointed out the presence of strontium in opium. It was looked on as an adulteration, although we must admit the possibility of it occurring naturally in opium.

It may be that the writer has failed to discover all the literature relating to this subject, and he is free to admit the possibility of it, since the literature concerning the ash constituents of plants is very voluminous. Any information bearing directly on this subject will be thankfully received.

David Hooper, who has held the post of Quinologist to the Madras Government, at Ootacamund, India, for the past twelve and a half years, has been appointed to the Curatorship of the Economic and Art Sections of the Indian Museum, Calcutta.

ALEXANDRIA AND INDIA SENNA.

METHOD OF DISTINGUISHING THEM IN POWDER.

BY L. E. SAYRE,

Member of Research Committee C, Revision Committee of United States Pharmacopœia.

The question of distinction and identification of the two sennas, Alexandria and India, was the subject of a recent preliminary paper by the author. Since the appearance of this, more careful and elaborate work has been done upon the same subject, the results of which are embodied in the present article. Some criticisms having been made upon this early work, due attention will also be paid to the disputed points in the endeavor to arrive at as truthful conclusions as possible. To aid in this, a series of photomicrographs have been carefully made, and are here reproduced. The accuracy of the drawings may be the subject of dispute, owing to the large personal factor that enters into their preparation, but the appearances shown by a photograph admit of no misconstruction, provided they be truly representative. It is unnecessary to state that in the present instance all reasonable precautions have been taken to show in a few reproductions as representative appearances as could be found in such limited areas. As contributing to a truthful understanding of the results obtained, a brief outline of the methods employed is given, and this is followed by the interpretations and conclusions.

While the true character of the tissues has been made the subject of careful study, the fact has constantly been borne in mind that the object of the whole matter is to secure a *simple* and accurate test for senna powders that shall be applicable to the uses of those for whom it is intended. It has been recognized that no one feature is found constant throughout the extent of the leaf, and that before any appearance can be pronounced representative, due care must be exercised by taking a sufficient number of observations. It is believed that all precautions have been taken in this investigation, and that the test proposed will prove reliable and sufficient.

Methods.—The photomicrographs of the epidermis were made from thin sections cut directly from the surface of the leaf, and subjected to no more treatment than was necessary to mount them in plain glycerin. The negatives were all made from these sections in a vertical camera of fixed length, attached to a Van Heurck micro-

scope whose optical parts were a Zeiss 8 mm. apochromatic objective and a No. 2 projection eye-piece. The source of illumination was the arc light, the crater of which was carefully focussed upon the object by the condenser. The actual magnification, measured by projecting the image of a stage micrometer upon the ground glass of the camera, is 240 diameters. No retouching or other alterations of the negative have been made. The drawings of parts

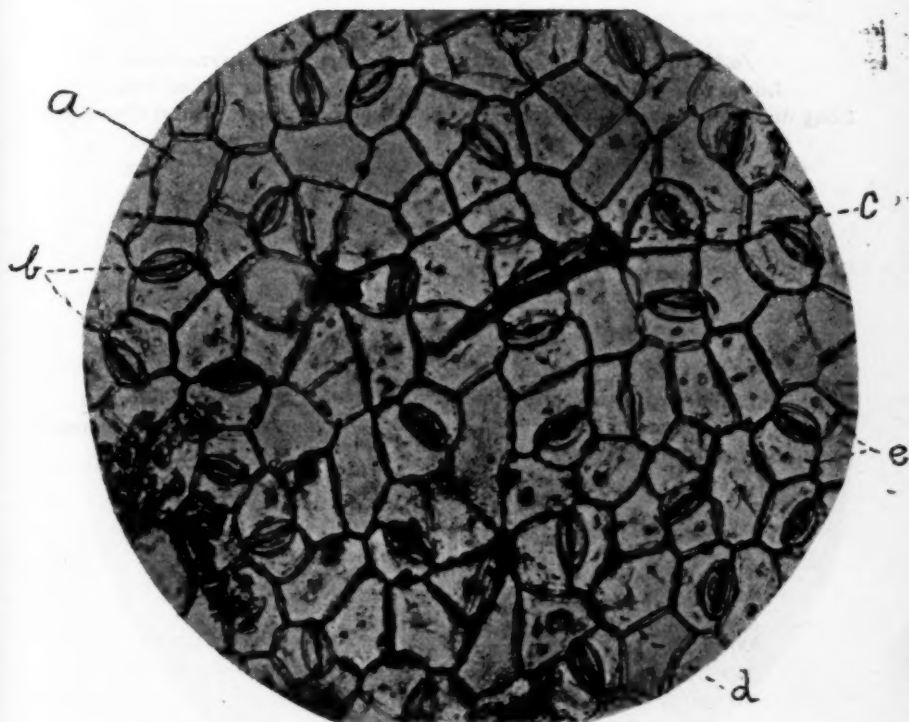


Fig. 1. India senna, under side of leaf; *a*, epidermal cell; *b*, stomata; *c*, hair; *d*, hair scar; *e*, nebenzellen.

found in the powder were all made by the camera lucida under like conditions of preparation and magnification. The amplification here is 200 diameters.

At the commencement of the work, in order to find some point of characteristic importance, the parts were thoroughly studied in their natural relations by means of sections, and the appearances there observed were then made the object of study in the powder.

Commencing in this manner with the ordinary epidermal cells, the following results were obtained: The size and shape of the epidermal cells are extremely variable (see *Figs. 6 and 7*), and are, as was stated in the former paper, little to be depended upon as a means of identification. However, no mistake was made in ascribing somewhat larger cells to the Alexandria variety, as the following table of careful measurements will show:

TABLE 1.

<i>India Senna.</i>			<i>Alexandria Senna.</i>		
Lower side of leaf.			Lower side of leaf.		
Long diameter.		Short diameter.	Long diameter.		Short diameter.
13	x	10	14.5	x	11
13	x	8.5	17	x	10
13	x	7	10.5	x	9
15	x	12			
<hr/>			<hr/>		
Av., 13.5	x	9.38	Av., 14	x	10

TABLE 2.

<i>India Senna.</i>		<i>Alexandria Senna.</i>	
Taken at random with two-thirds objective. Some long and some short diameters.		Two-thirds objective diameter, taken at random.	
1.4		2.2	
1.6		1.7	
1.5		1.4	
1.2		1.5	
1.2		1.8	
		1.6	
<hr/>		<hr/>	
Av., 1.38		Av., 1.7	

TABLE 3.

<i>India Senna.</i>		<i>Alexandria Senna.</i>	
Adjacent cells of upper side of leaf, two-thirds objective.		Adjacent cells of upper side of leaf, two-thirds objective.	
1.7		1.9	
1.8		1.8	
0.6		1.5	
1.5		2.3	
<hr/>		<hr/>	
Av., 1.4		1.6	
		0.6	
		0.7	
		<hr/>	
		Av., 1.48	

AVERAGES EXPRESSED IN MICROMILLIMETERS.

TABLE 1.	
<i>India Senna.</i> Lower side of leaf. 38'61 x 26'815	<i>Alexandria Senna.</i> Lower side of leaf. 40'04 x 28'6
TABLE 2.	
<i>India Senna.</i> Average diameter, 40'02	<i>Alexandria Senna.</i> Average diameter, 49'3
TABLE 3.	
<i>India Senna.</i> Upper side of leaf, 40'6	<i>Alexandria Senna.</i> 43'09

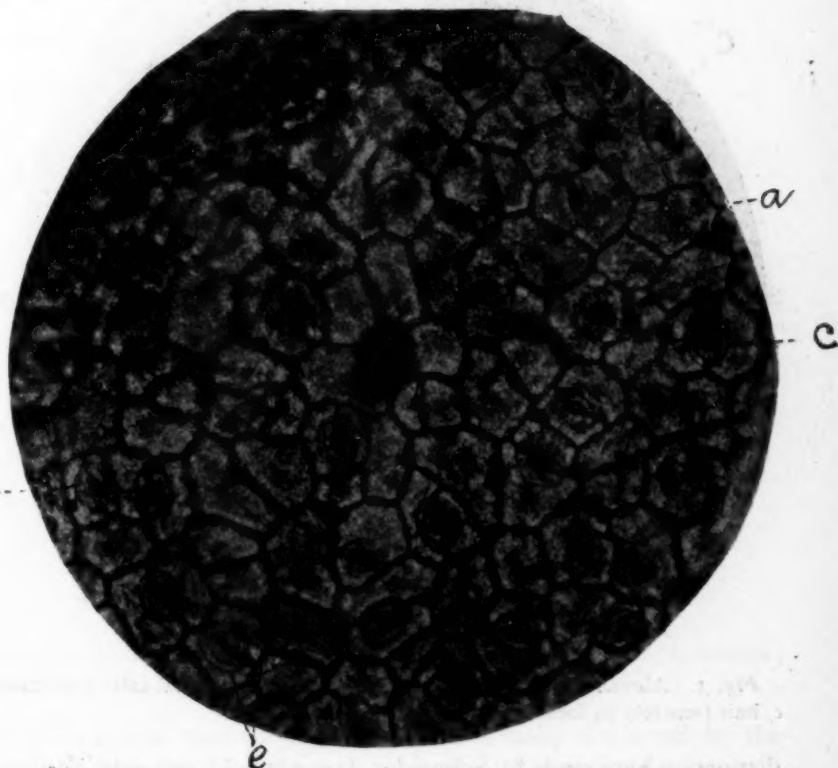


Fig. 2. India senna, upper side of leaf; a, epidermal cell; b, stomata; c, hair (scarcely in focus); e, nebenzellen.

Nevertheless, it is not to be denied that sections of epidermis may be found in which the India senna may exhibit the larger cells. A series of about forty measurements, made by a student in the school here, showed that while the largest cells are found in

the Alexandria senna, the average size of the cells of the India senna may be somewhat greater than those of the Alexandria senna. Likewise, the cell walls alone will not serve as a point of differentiation, owing to the same lack of uniformity. As regards the shape of the cells, no distinctive value whatever can be placed upon it, owing to the great variability present. The same may also be said concerning the arrangement of cells around the hairs. The

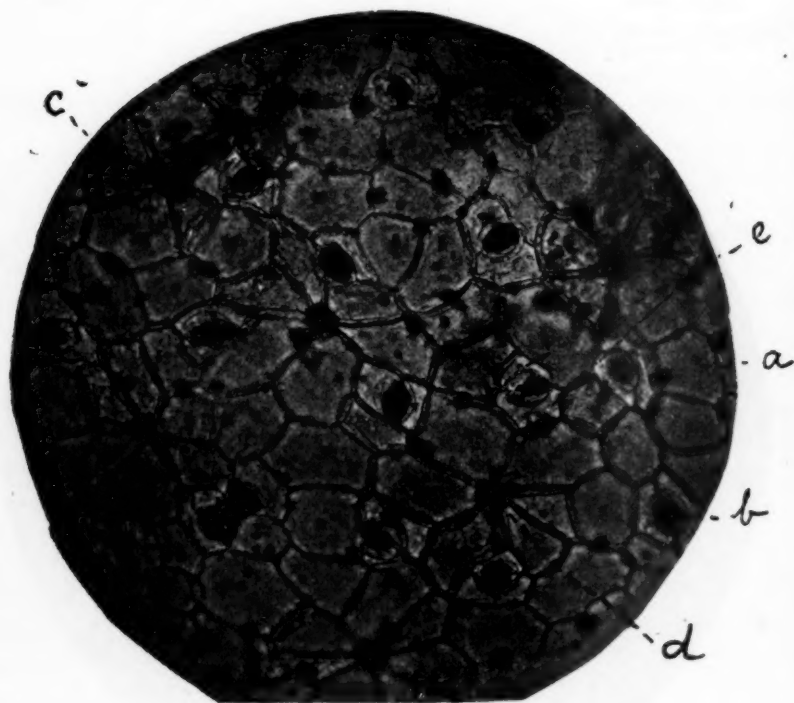


Fig. 3. Alexandria senna, under side of leaf; *a*, epidermal cell; *b*, stomata; *c*, hair (scarcely in focus); *d*, hair scar; *e*, nebenzellen.

distinction here made by Schneider does not hold, as a rule, although a small majority of cases may be found to accord with the statements made by this authority.¹

In thirty cases, the stomata of Alexandria senna showed sixteen with two neighbor-cells (nebenzellen) and fourteen with three. Forty stomata on the epidermis of India senna exhibited twenty-

¹ *American Druggist*, April 10, 1897, p. 195.

two with two nebenzellen, fifteen with three, and three with four. These results seem to eliminate the epidermal cells from further consideration, but more of value may be expected of the stomata. Exception will have to be taken, however, to the statements made by Schneider concerning the number and size of the neighbor-cells (nebenzellen). That the India senna usually possesses two, and

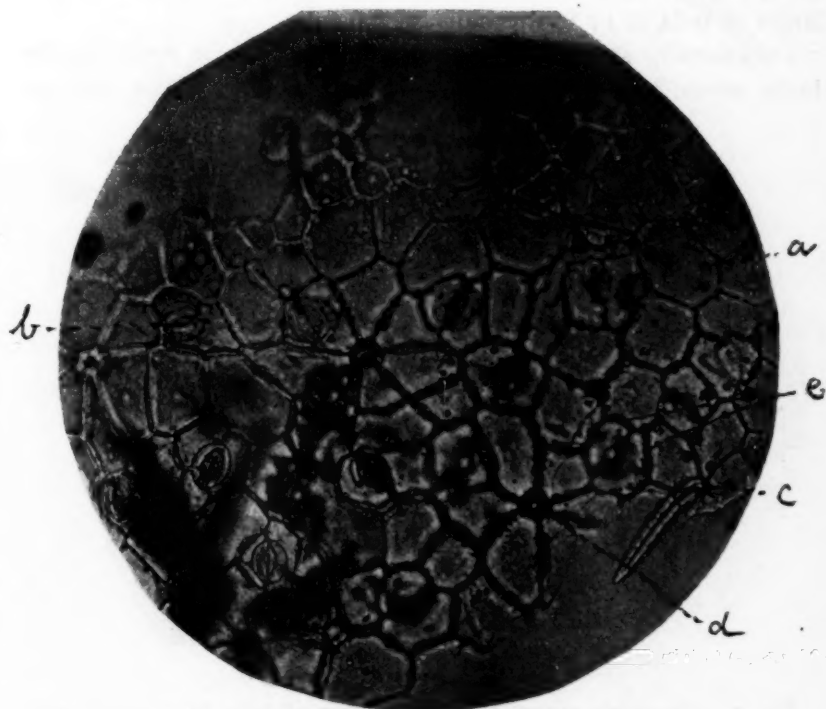


Fig. 4. Alexandria senna, upper side of leaf; *a*, epidermal cells; *b*, stomata; *c*, hair (in focus); *d*, hair scar; *e*, nebenzellen.

the Alexandria senna a larger number, is easily disproved by the accompanying figures.

Likewise the statement that when two are present in the Alexandria senna they are of equal size, cannot be confirmed by examination. (See *Figs. 3* and *4*.) But whatever number may obtain in either case, it is so inconstant a character as to be of no value as a discriminating factor. There is, on the contrary, a point of great distinctive value to be found in the size and shape of the

stomata themselves, a feature that was overlooked in the preliminary paper. Here it will be noticed that almost invariably the stomata of the Alexandria senna are smaller and much rounder than those of the India. References to *Figs. 1* and *4* will make this clear. Measurements of a considerable number of stomata in each case gave the following ratio between the longer and shorter diameters: In Alexandria the shorter diameter bore a ratio to the larger of 0.84 to 1; in the India, of 0.6 to 1.

Occasionally stomata of a rounded form may be found in the India senna, but they do not look like the Alexandria and are

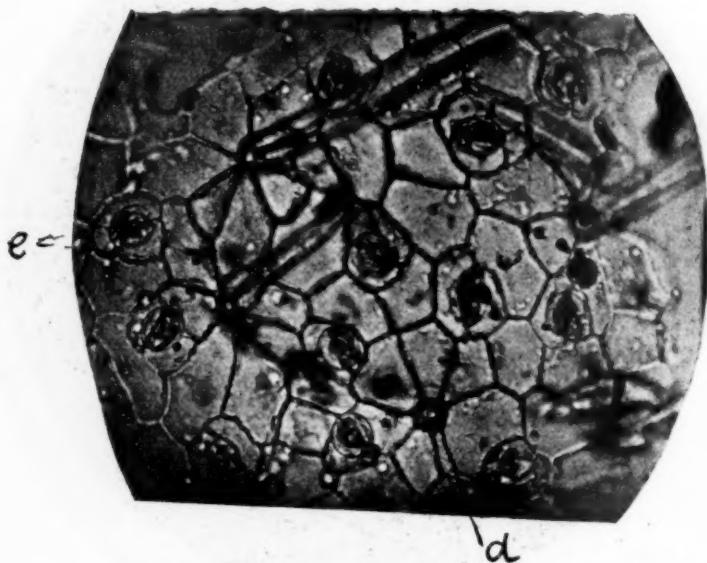


Fig. 5. Alexandria senna, showing number of hairs in a limited area; *d*, hair scars; *e*, nebenzellen.

larger. At the present state of the investigation, this character represents by far the most characteristic difference between the two species and, together with the number of hairs, affords the best means of detecting a mixture of the two in powdered form.

The opinion reached by the author in the former paper, that the number of hairs shown by the two species is a valuable means of distinguishing them apart, is, after yet more careful research, again advanced. It would seem at first sight that the test proposed by Schneider, *i. e.*, estimating the number of hair scars upon the epi-

dermis, would be more accurate than counting the free hairs in the powder; but it is really unreliable, because the distribution of the hairs is not uniform. This objection does not apply to the counting

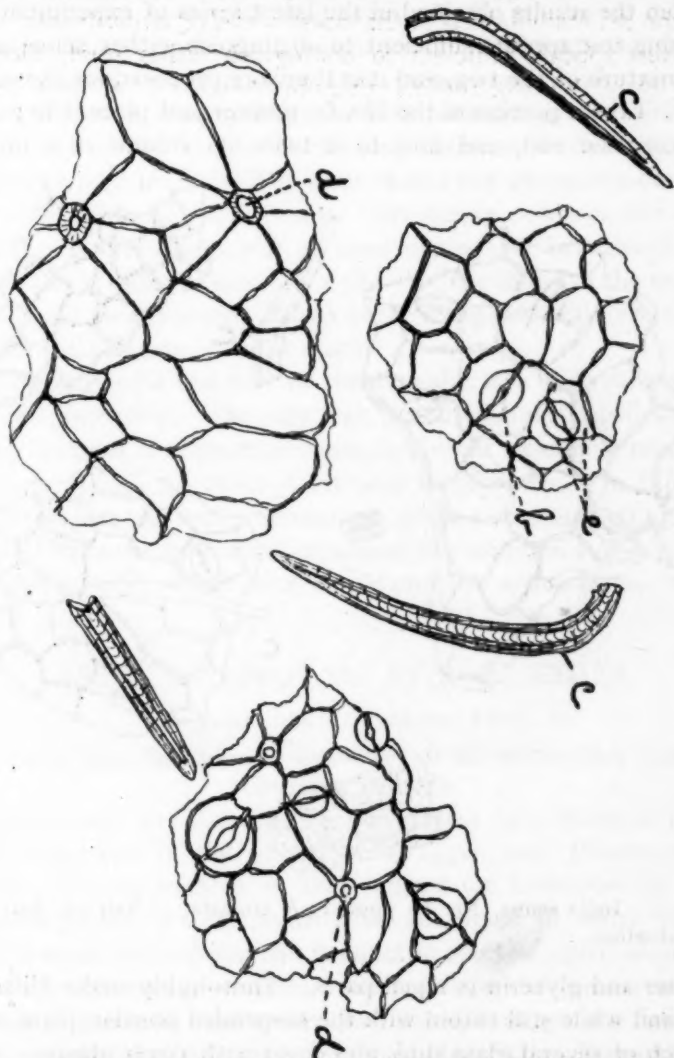


Fig. 6. Alexandria senna, No. 60 powder; *b*, stomata; *c*, hairs; *d*, hair scars; *e*, nebenzellen.

of the free hairs, for by powdering the leaves and shaking the powder up in a liquid, the distribution is made comparatively uniform.

The objection that fragments may be counted as whole hairs is easily overcome by choosing some readily distinguishable part of the hair, such as the tip, and using only it as the unit of estimation.

From the results obtained in the latest series of experiments the following test appears sufficient to distinguish either senna alone, or a mixture of the two, and it is therefore proposed for these purposes: Take a portion of the No. 60 powder and place it in a small homœopathic vial, and add to it twice its volume of a mixture

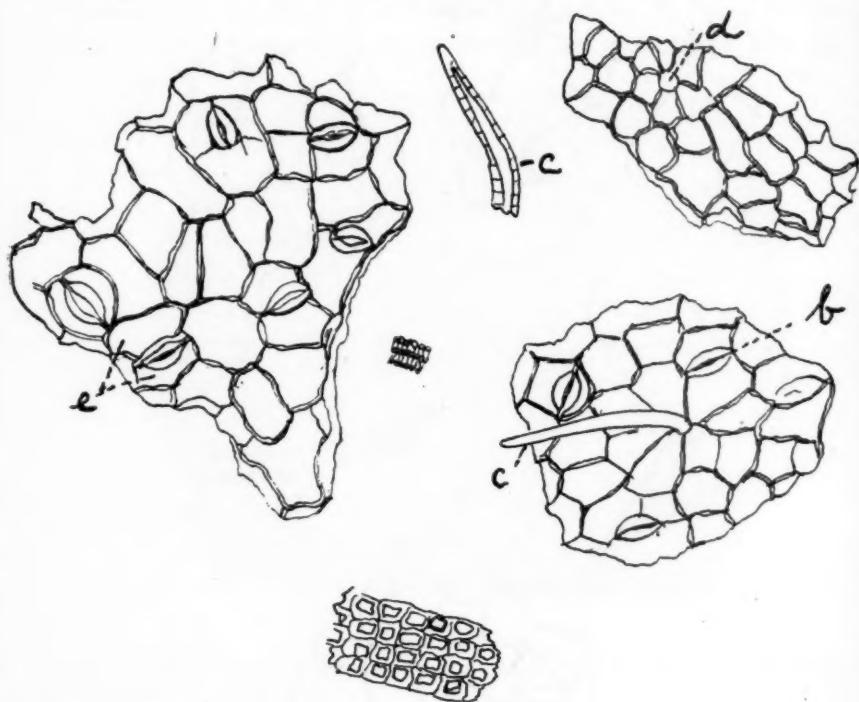


Fig. 7. India senna, No. 60 powder; *b*, stomata; *c*, hair; *d*, hair scar; *e*, nebenzellen.

of water and glycerin in equal parts. Thoroughly shake this mixture, and while still turbid with the suspended powder, place a drop on each of several glass slips, and cover with cover glasses. If air bubbles or too great opacity exist, heat to boiling over an alcohol lamp. Search for hairs showing the tips present, and if they appear abundant, one to four in each field of a $\frac{1}{4}$ -inch objective, Alexandria senna is present. To further confirm this, examine several frag-

ments of the normal epidermis for the stomata. If many are found that are quite round in outline (*b*, *Fig. 4*), the presence of *Alexandria senna* is assured. As confirmatory to this, the number of hair scars upon the epidermal fragments may be employed. These should be found frequently at a distance of from two to five epidermal cells apart. A sample of *India senna*, on the contrary, will exhibit few hairs, often none in the field, and the great majority of the stomata will be found with the long diameter much longer than the short one (*b*, *Fig. 1*). The hairs should not frequently be closer than five epidermal cells apart. In simple powders the mere number of hairs present will at once distinguish between the two *sennas*, but in cases of mixture of the two, the shape of the stomata will have to be examined. Many of the elongated oval form always indicate the presence of *India senna*.

However good a test may be theoretically, it is of no value unless it works practically. The only way to tell whether it will do this or not, is to put it in practice under conditions which will represent, as nearly as may be, those of its usual employment. In this particular instance the test proposed was given a thorough trial in the hands of eighteen students of representative abilities, and in no case did it fail to work, either with simple powders or mixtures.

ASSAY OF SPIRIT OF NITROUS ETHER.

BY LAWRENCE A. KESSLER, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 167.

My attention was attracted to this subject by a series of papers which appeared in the *American Druggist and Pharmaceutical Record*. To the number of that journal for December 25, 1895, Professor David Walker contributed an article in which he proposed a rapid method for the volumetric assay of spirit of nitrous ether. His process of assaying was based on the measurement of the iodine liberated from potassium iodide, through the decomposition of spirit of nitrous ether by the United States Pharmacopœia process of assay.

The proposed test was made by carefully measuring 5 c.c. of spirit of nitrous ether into a 4-ounce Erlenmeyer flask, from a pipette; this was followed with 10 c.c. of 6 per cent. acetic acid and

10 c.c. of potassium iodide test solution. The mixture was occasionally agitated during ten or fifteen minutes, a few drops of starch test solution added, and the mixture titrated with decinormal sodium thiosulphate volumetric solution, until the bluish-green color was discharged. The mixture afterwards assumed a dark color; but if the time of maceration does not exceed fifteen minutes, the number of cubic centimeters required to first discharge the color will give nearly or quite as accurate results as the nitrometer. Prof. Walker also said: "While the titration process may not be quite as accurate in its figures as the modified Allen method, it involves much less expense, and the results are sufficiently accurate for practical purposes." This last claim Prof. Walker seemed to have substantiated by the figures of a table which he gave to show the results of the assay of ten samples by the two methods.

On January 25, 1896, the same journal published a letter from Mr. Peter MacEwan, of London, England, in which that gentleman directed attention to the fact that the method proposed by Professor Walker had been suggested by Mr. D. B. Dott a dozen years ago, and had to be abandoned on account of the fallacious results, for whenever the nitric oxide liberated by decomposition of the ethyl nitrite comes in contact with the air of the flask, nitrogen tetroxide is formed. This at once decomposes more of the alkaline iodide; indeed, decomposition might go on indefinitely if the supply of air and iodide were large enough. Mr. Dott endeavored to obviate this objection by various means, such as working with an open dish in which carbon dioxide was simultaneously generated, but with modified success. It was his knowledge of the difficulties of this method which led Mr. A. H. Allen to effect the reaction in an air-free space and estimate the nitric oxide instead of the iodine; the method was adopted by many chemists, and simultaneously indirect estimation through the iodine factor was deservedly forgotten. A man who knows all the worries of the latter process may get fairly accurate results, but the novice or careless worker may return a 3 per cent. ethyl nitrite spirit as containing anything between that and, say, 30 per cent., because he is never sure about the end point.

Professor Walker defended the utility of the titration method in a reply to Mr. MacEwan in the issue of February 10, 1896, and stated that further investigation had shown that five minutes' maceration was ample for the completion of the reaction. As stated at the begin-

ning of this article, my attention was attracted by the controversy referred to, and I undertook some experiments with the titration method as proposed by Professor Walker, in order to ascertain if it could be placed in the hands of pharmacists as a practical method.

In the first set of titrations, sufficient decinormal sodium thiosulphate volumetric solution was added to discharge the bluish-green color, so that it did not return in thirty seconds. The reason for adopting this plan was to afford the operator proof that decoloration had been effected. The color quickly reappeared after decoloration on account of the liberation of iodine by the nitrogen tetroxide, as pointed out by Mr. MacEwan. This reaction is also, of course, going on from the time the materials are mixed, and even during titration, so that iodine is being alternately liberated and titrated. The tendency of the method must, therefore, be toward high results, for the same iodine is repeatedly taken into account. The rapidity with which the volumetric solution of sodium thiosulphate is added, as also the quantity added at a time, influences the amount required for decoloration. The more rapid the addition of sodium thiosulphate and the larger the portion added, the less the total quantity required for the first decoloration.

The following figures show the amounts of decinormal sodium thiosulphate volumetric solution required for the titration of the iodine liberated by portions of 5 c.c. of a few of the samples of spirit of nitrous ether examined:

Sample No	Minutes Macerated.	C.C. of V. S. Required,
1	15	24'7, 23'1, 14'4, 14'0
2	15	14'2, 16'1, 10'2, 10'7
3	15	20'5, 20'2, 18'9, 19'4
4	15	28'2, 28'3, 32'2
5	15	{ 30'4, 30'8, 33'6, 34'5 35'3, 37'3, 37'3, 32'0
5	10	25'2, 27'3
5	5	24'6, 20'6

The titrations were conducted as nearly alike as possible. The figures for sample 5 also show the effects of the time of maceration. After concluding that the titration method was not trustworthy, even when conducted under the conditions and restrictions proposed, I made a series of tests with the nitrometer according to the United States Pharmacopœia process of assay. Two difficulties were

encountered in this method. One of these difficulties attended the assaying of samples of the spirit which were acid in reaction; it consisted of a decomposition between the acid spirit and the potassium iodide, with evolution of nitrogen dioxide before the normal sulphuric acid was added. Spirit of nitrous ether is usually acid; of the sixteen samples examined during the course of this work, not one was neutral, but most of them were very acid. To overcome the difficulty referred to, the sample to be assayed was neutralized by mixing it with one-fifth its volume of an alcoholic solution of potassium hydrate. Six c.c. of this mixture instead of 5 c.c. of the original sample were then taken for each estimation.

The following figures show the results which were obtained by the official method on the same sample, before and after neutralizing:

Sample A.	Acid.	Neutralized.
(1) 5 c.c. gave	22'0 c.c. NO	and 21'0 c.c. NO.
(2) 5 " "	24'0 " "	" 20'4 " "
(3) 5 " "	24'4 " "	" 20'4 " "

The other difficulty encountered in the official assay process was the displacement of air from the aqueous solution of potassium iodide when this liquid was let into the burette of the nitrometer containing the spirit on top of the brine. Any inaccuracy which might arise from this cause could be prevented by raising the level tube and then opening the stopcock so the air could pass out. But this could not be done unless the sample was free from acid, on account of the premature reaction which takes place between the potassium iodide and the spirit in the presence of acid. To obviate this difficulty, I tried using a saturated alcoholic solution of potassium iodide in place of the aqueous solution, as directed by the United States Pharmacopœia. The results were satisfactory, as but little or no air bubbles collected in the burette. In order to supply the required amount of potassium iodide, which is not so soluble in alcohol as in water, 20 c.c. of a saturated alcoholic solution were used instead of the 10 c.c. of aqueous solution of potassium iodide.

Three samples were neutralized with the alcoholic solution of potassium hydrate, and submitted to the official method of assay with the nitrometer, the alcoholic solution of potassium iodide being used in place of the aqueous solution ordered by the Pharmacopœia. The results were as follows:

Sample.

B	(1)	5 c.c.	gave	21.6 c.c.	NO.
	(2)	5 c.c.	"	21.6	" "
C	(1)	5 c.c.	"	50.0	" "
	(2)	5 c.c.	"	50.0	" "
D	(1)	5 c.c.	"	47.0	" "
	(2)	5 c.c.	"	47.2	" "

The displacement of air from the aqueous solution of the potassium iodide might also be overcome by boiling the solution and allowing it to cool out of contact with air just previous to use, but this method was not tried.

The quality of the spirit of nitrous ether dispensed is remarkably poor.

NOTE ON RED MERCURIC OXIDE.

BY JOSEPH W. ENGLAND.

I have read with interest Mr. Charles H. LaWall's paper on the "Consideration of Some Recent Suggestions Concerning Ointment of Mercuric Nitrate," as published in the current issue of the AMERICAN JOURNAL OF PHARMACY.

It will be recalled that I urged the use of red mercuric oxide in place of metallic mercury, in the making of citrine ointment. This practice was suggested as an alternative, and not as a substitute for the official formula. The average pharmacist always has red mercuric oxide in stock; he does not always have metallic mercury, and it was thought to be directly on the line of increased convenience to urge the substitution of the oxide, in proportionately larger quantity, for the metal, when occasion required.

To the use of red mercuric oxide in place of metallic mercury for this purpose, Mr. LaWall says: "As to the relative purity of the two substances, the experience of a large manufacturing establishment shows that the commercial metallic mercury is of far greater uniformity and purity than the red oxide of commerce."

This statement does *not* accord with the writer's information. A letter from one of the leading firms of manufacturing chemists says: "We would state that our red mercuric oxide conforms strictly to the requirements of the United States Pharmacopœia, and we regard it as equal in purity to metallic mercury."

Another firm of manufacturing chemists, equally as prominent, writes: "Our analysis shows that red mercuric oxide contains 99.7 per cent. HgO , and 0.3 per cent. of SiO_2 . The silica is, no doubt, derived from the vessels in which the mercuric oxide is manufactured. Commercial metallic mercury varies between 99 and 100 per cent., while the distilled mercury is pure."

Another prominent chemical firm writes: "We would state that our levigated mercuric oxide conforms to all the requirements of the U.S.P. 1890, save as regards absolute freedom from HNO_3 ; it contains very small traces of the latter. It conforms strictly to all the requirements of the Ph.G. iii, also, in regard to HNO_3 . There is no doubt that the U.S.P. is hypercritical in the case of red mercuric oxide, as it is also in several other instances; for the faint traces of HNO_3 that our levigated grade contains are not known to interfere with any of the chemical applications of the preparation, and cannot possibly have any influence on the therapeutic action of the medicament. To provide an oxide absolutely free from HNO_3 , is practically impossible commercially, and there is no necessity for the preparation."

Now, the point the writer would make is this: If the statements of three of the leading chemical firms of the country, regarding the purity of their red mercuric oxide, be true, then there should be no difficulty whatever in the pharmacist procuring an oxide that could be used as a substitute, if necessary, for metallic mercury in the making of ointment of mercuric nitrate.

Further, the writer recommended the addition of glycerin to the finished ointment, *not* to prevent *sponginess*—that is a condition due to the application of insufficient heat—but to prevent the hardening and ultimately friable condition that obtains in the ointment on long standing. Regarding the criticism that the addition of 50 grammes of glycerin to 1,000 grammes of ointment of official strength reduces the percentage of mercuric nitrate below that required by the U.S.P., there is this to say: that the resulting difference in strength is of no practical moment *therapeutically*, as physicians almost invariably—save in those cases requiring great stimulation—dilute the ointment they prescribe—oftentimes in equal proportions—with lard or other fatty diluent.

The final criticism of increased cost is hardly worth consideration. The alternative use of 75.5 grammes of mercuric oxide (costing

about 6 cents an ounce avoirdupois) as against 70 grammes of metallic mercury (costing about 5 cents an ounce, avoirdupois), to make the official quantity of ointment, or a little over 2 pounds, is of no practical moment whatever.

A sample of the ointment made on March 17, 1897, by the use of red mercuric oxide, is presented to this Pharmaceutical Meeting. While it has slightly darkened in color, it has retained its smoothness, and has undergone no hardening whatever.

NOTE ON A SAMPLE OF SCAMMONY.

BY I. W. THOMSON.

Some time ago a parcel was handed to me, marked "Scammonium," accompanied by a statement that it contained 84.864 per cent. of scammonium, and, that there might be no mistake, gave the chemical formula, which is generally accepted as representing that body $C_{32}H_{56}O_{16}$. It was said to be of German origin.

A very cursory examination of the sample so completely belied its certificate of character, that I concluded it could hardly claim more than a very remote relationship with scammony.

Having mentioned the circumstance to Mr. Hill, he suggested that I might exhibit the sample and submit the result of my examination of it at an evening meeting.

The sample consists of irregular broken pieces, apparently portions of a cake, about half an inch in thickness, greenish-black, hard and horny, breaking with a resinous fracture, and very difficult to powder. On submitting it to a systematic examination, the following results were obtained:

	Per Cent.
Soluble in ether	0.4
" " alcohol	2.0
" " water	42.6
Starch and a little cellular tissue	43.0
Moisture	12.0
	—
	100.0

It yielded 2.12 per cent. of ash, of which 0.93, equal to 43.6 per cent. was soluble in water. The ash contained K, Mg, Ca, Fe, and Si, as carbonate, sulphate, and a trace of chloride.

The water-soluble portion was evidently gum, apparently gum

arabic. The insoluble portion consisted very largely of starch, with a small quantity of cellular tissue.

So far as I know, the specimen is unique, and the Germans must think us very gullible when they attempt to foist such an article upon us as scammony.—*Pharmaceutical Journal*, March 20, 1897.

THE CULTIVATION OF SUMBUL IN ENGLAND.¹

BY E. M. HOLMES.

The sumbul root of commerce has of late years been of very inferior quality compared with the fragrant root imported twenty-five years ago or more, and usually consists of smaller and more cylindrical pieces, with only a very faint musky odor. The structure is also much firmer, and the resinous parts are usually blackish and dirty, in strong contrast to the paler non-resinous portions. The upper or rootstock portion, which is marked with rings like the true sumbul, is evidently often branched, which I have never seen in the true sumbul, in which the upper portion usually tapers to a rounded fibrous apex.

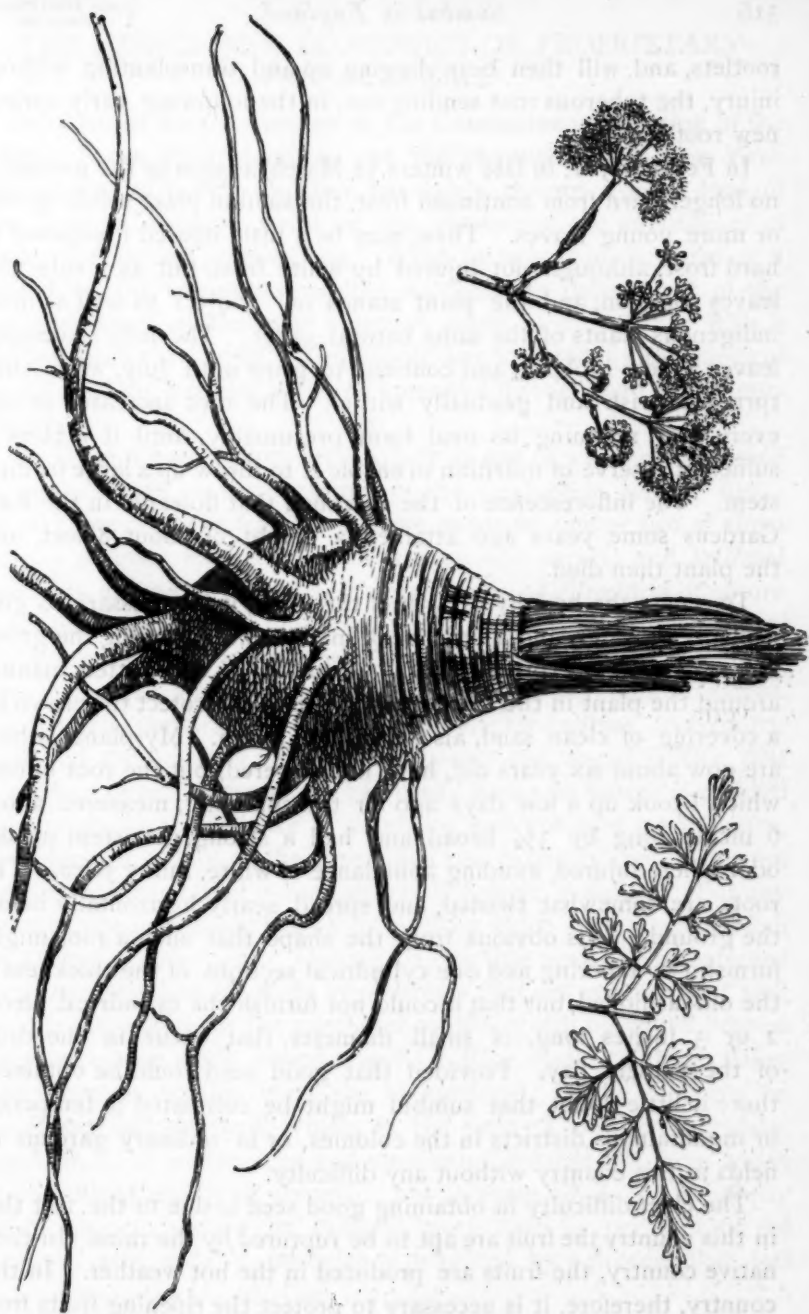
The sumbul of the present day is, therefore, probably derived from a different plant with a more cylindrical root, branched near the apex, and having a firmer substance. It was suggested some years ago by Dr. J. E. Aitchison (*Trans. Linn. Soc.*, ser. 2, Bot., p. 69, pl. 20-21) that it might possibly be derived from *Ferula suaveolens*, which has only a faint musky odor. He states that the root is scented, and is one of the kinds of sumbul exported from Persia to Bombay by the Persian Gulf (*l. c.*, p. 69).

It seems to be desirable, therefore, that the true sumbul should be cultivated to meet a trade desideratum. The use of an inferior drug will otherwise probably lead in time to the entire disuse of the drug. Under these circumstances my own experience in the cultivation of the true sumbul plant may prove interesting to some of the readers of the *Pharmaceutical Journal*.

Some years since, one of our corresponding members, M. Andrew Ferrein, of Moscow, sent me some young plants of *Ferula foetidissima*, and with them two young plants of *F. sumbul*. They arrived in autumn, packed in husks of buckwheat, like ordinary bulbs. The fleshy roots at that period of the year appear to lose all the small

¹ *Pharmaceutical Journal*, April 24, 1897.

Fernia Sumbul. Root grown at Seven Oaks, Kent, together with portion of leaf and flower (all one-ninth natural size).



rootlets, and will then bear digging up and transplanting without injury, the tuberous root sending out, in the following early spring, new rootlets.

In February, or, in late winters, in March, as soon as the ground is no longer hard from continued frost, the sumbul plant sends up one or more young leaves. These may be a little injured if exposed to hard frost, although not injured by white frost, but as a rule new leaves come on, and the plant stands our winters as well as most indigenous plants of the same natural order. The fully developed leaves appear in April, and continue to grow until July, when they turn yellowish and gradually wither. The root increases in size every year, retaining its oval form, presumably, until it attains a sufficient reserve of nutrition to enable it to throw up a large fruiting stem. The inflorescence of the specimen that flowered in the Kew Gardens some years ago attained a height of about 8 feet, and the plant then died.

To secure the healthy growth of the plant, it is necessary to give it plenty of water, and a little weak manure water, during the growing season, from April to July. A mulch of well-rotted manure around the plant in the autumn, taking care to protect the crown by a covering of clean sand, also helps its growth. My plants, which are now about six years old, have not flowered, but the root of one, which I took up a few days ago for transplanting, measured about 6 inches long by $3\frac{1}{2}$ broad, and had a strong, persistent musky odor where injured, exuding abundance of white, milky juice. The roots are somewhat twisted, and spread nearly horizontally below the ground. It is obvious from the shape that such a root might furnish two tapering and one cylindrical sections of the thickness of the old-fashioned, but that it could not furnish the cylindrical pieces 2 or 3 inches long, of small diameter, that occur in the drug of the present day. Provided that good seed could be obtained, there is little doubt that sumbul might be cultivated in temperate or mountainous districts in the colonies, or in ordinary gardens or fields in this country without any difficulty.

The chief difficulty in obtaining good seed is due to the fact that in this country the fruit are apt to be ruptured by the rains. In their native country, the fruits are produced in the hot weather. In this country, therefore, it is necessary to protect the ripening fruits from rain.

THE ETHICS AND ECONOMICS OF PROPRIETARY PREPARATIONS.¹

Dr. Charles Rice, a member of the Committee of Revision of the United States Pharmacopœia, and the chemist of the New York department of public charities, has lately thrown a good deal of the light of common sense on the question of the advisability of using proprietary preparations. What he says is in the form of a report to the committee on the apothecary's department of the medical board of Bellevue Hospital, made in compliance with a request from that body. The report was adopted by the medical board on April 1st, and has been approved by the board of commissioners.

Dr. Rice defines a proprietary article as one of which some person or persons have exclusive control of the production, sale or use—of all three of these features in some cases, of one or two of them only in others. He divides such articles into natural and artificial products, and again into these three classes: (1) Products of nature prepared under patents and mostly sold under copyrighted names. (2) Products of nature that have never been made under patents or are no longer so made, but are sold under copyrighted names. (3) Artificial preparations sold under copyrighted names. As regards patented articles, it is a principle in patent law, says Dr. Rice, that a product of nature cannot be patented; hence no patent is granted on any chemical substance of a definite and constant composition, even though it may, at the time when the patent is applied for, not yet have been found occurring ready-formed in nature. But any process, not previously known or used, by which such a product can be formed is patentable. Certain articles that are made by patented processes may also be made by processes that are not patented, and, as it is impossible for the purchaser to distinguish by which process they have been made, nobody, says Dr. Rice, would think of raising any objection against their use in medicine. As an example, he mentions salicylic acid, which, in the form of methyl salicylate, exists in oil of wintergreen and some other volatile oils, from which the acid may readily be prepared; but as these oils would be utterly inadequate to supply the demand, more than 95 per cent. of the salicylic acid used in medicine is produced by a process that was

¹ Editorial in the *New York Medical Journal*, May 22, 1897.

patented in 1874, but on which the patent has now expired. A patent, says Dr. Rice, not only does away with all secrecy—which is usually considered the objectionable feature of a proprietary article—but it commonly acts also as a sort of guarantee of the uniformity of the product in composition, strength and purity.

Dr. Rice thinks that if all these points are taken into consideration, it will probably be conceded that, if an article is protected by a patent alone—the feature of a copyrighted name being disregarded—it becomes practically impossible to separate patented substances into classes of which one may, and the other may not, be used without a violation of ethics, and, therefore, none of these articles should be rejected for the reason alone that they are patented. He then proceeds to consider the three classes of proprietary articles previously mentioned.

As to products of the first class, inasmuch as copyrights on names never expire, whereas a patent has a definite term of years to run, it is evident, says Dr. Rice, that the proprietors of the copyrights would have a perpetual monopoly unless, after the expiration of the patents, other producers should put the same articles on the market under new names not copyrighted. All these bodies—such as antipyrine, aristol, phenacetine, salol, salophene, sulphonal, trional, and vanillin (the last-named substance being now sold only under its proper chemical name)—will undoubtedly, Dr. Rice thinks, be rescued from their present monopolistic control, when the patents on them have expired. There is no secret whatever about them, he says. They are definite chemicals of known composition and properties, and, since some of them have been found to have real therapeutical value, no objection, it is believed, will be raised against the whole class.

Dr. Rice next considers the products of nature which have never been, or are not now, made under patents, but are sold under copyrighted names, familiar examples of which are antifebrine (acetanilid), dermatol (bismuth subgallate), formalin or formol (formaldehyde), pyrozone (hydrogen-dioxide solution), diuretin (sodium-theobromine salicylate), and lanolin (hydrous wool fat). The owner of the copyrighted name, he remarks, usually professes that his product is “purer” or more “refined” than the article found on the market under the common name, and this pretension, he says, is true in some instances, particularly in those articles first

put on the market under copyrighted names, although at present the best grades of the several articles sold under their common names appear to answer every purpose. These products, he thinks, are unobjectionable, but he says it seems preferable, as it is certainly more economical, to order them under their common names, especially acetanilid, bismuth subgallate and formaldehyde.

His third class preparations that are not products of nature, sold under copyrighted names, Dr. Rice divides into three groups. The first group, which he considers unobjectionable, comprises preparations the origin and composition of which are not kept secret, such as ichthyol, creolin, Mellin's food, malted milk, etc. The second group, which he thinks to be of doubtful value, includes all the preparations of the class that do not belong to either the first or the third group, which last, by far the largest, consists of the "secret nostrums," such as "soothing syrups," "female regulators," "blood purifiers," etc.

Incidentally, Dr. Rice justly complains that for years the name of Bellevue Hospital has been taken in vain by a number of persons and firms without any authority whatever. It is a common occurrence, he says, for samples of proprietary medicines, foods, mineral waters, plasters, etc., to be sent to the hospital or to members of the house staff for "trial," whereupon the subsequent advertisements of the articles in question often assert that the latter are "used in Bellevue Hospital," leaving the impression upon the mind of the reader that the article or articles have been used with the sanction of some member of the medical board. It is probably impossible, says Dr. Rice, to find a remedy for this evil, from which many other institutions of repute likewise suffer. To publish a denial of such false assertions, he thinks, would only aggravate the evil. The utmost that can be done appears to be to caution the medical staff against any entanglements with the agents of the interested parties, or encouragement of them.

The existence of *philippium* is claimed by M. Marc Delafontaine, in the *Chemical News* for May 14, 1897. Its chief characters are described. Its symbol is Pp., and its atomic weight 80, 120 or 160, according to whether the oxide is PpO , Pp_2O_3 , or PpO_2 .

Philippium is more closely allied to cerium and terbium than to any other of the yttrium and cerium metals. It is to yttrium what cerium is to lanthanum.

RECENT LITERATURE RELATING TO PHARMACY.

PASSION FLOWER, PASSIFLORA INCARNATA, IN EPILEPSY AND OTHER NEUROSES.

S. D. Bullington, M.D. (*Nashville Journal of Medicine and Surgery*, March, 1897), reported some very favorable results from the administration of the fluid extract of passion flower, either alone or in conjunction with other medicines, in a number of cases of nervous disorder.

A case of epilepsy of twenty-six years' standing showed marked improvement after treatment with this drug, although, of course, it was not hoped to effect a cure in a case of so long standing.

Various cases of insomnia, hysteria and neurasthenia were likewise treated with the drug with satisfactory results.

The author stated that the fluid extract, mixed well with water or simple elixir, was pleasant to take, and an admirable substitute for bromide.

Another feature in its favor was that no ill effects seemed to follow its use, either temporary or continued.

COMMERCIAL GINGER AND ESSENCE OF GINGER.

W. S. Glass (*Pharmaceutical Journal*, March 20, 1897) examined samples of Jamaica, Cochin and African ginger, with a view to obtaining a satisfactory essence. His results are given in the following table, the percentages of oleoresin obtained by three other writers being also given for comparison:

AUTHOR THRESH. SIGGINS. ¹ RIEGEL.						
	Moisture.	Ash.	Extract or Oleoresin.	Extract or Oleoresin.	Extract or Oleoresin.	Extract or Oleoresin.
Jamaica	9'33	5'3	5'00	3'290	5'00	5
Cochin	11'00	4'6	4'33	4'965	—	—
African	8'00	5'5	6'33	8'075	{ A 6'17 B 7'00	—

¹ AM. JOUR. PHARM., Vol. 60, p. 278.

The extract was prepared by exhausting the drug with ether and evaporating at a low temperature. The African variety required most ether and yielded the highest percentage of extract; but, as

stated by the author, this variety was unsuited for many pharmaceutical purposes on account of its brown, coarse appearance.

For the preparation of a soluble essence possessing all the flavor of the ginger it was recommended to add 3 drachms of powdered pumice-stone to 1 fluid ounce of the essence, and shake occasionally during twelve hours. Then add gradually 3 fluid ounces of distilled water; allow the mixture to stand six hours and filter.

REPORT OF COMMITTEE ON ATOMIC WEIGHTS.

The fourth annual report of the Committee of the American Chemical Society on Atomic Weights, has recently been published (*Four. Amer. Chem. Soc.*, 19, 359). The chairman, Dr. F. W. Clarke, gives the following illustration of the practical value of a correct knowledge of atomic weights in the commercial world: "There are two rival values for the atomic weights of chromium. One, 52.5 approximately, based on the old work of Berlin, is still used by European analysts. The other, 52.1, depends upon later and more accurate researches, and is used in this country. Mr. William Glenn, of the Baltimore Chrome Works, informs me that that establishment imports chrome iron ore by the shipload, the value being determined by a volumetric assay, in which the atomic weight of chromium is involved. It is assayed in Glasgow, with the older value for chromium, and in Baltimore with the modern datum. A cargo amounts to about 3,500 tons, and the difference in price due to the difference between 52.1 and 52.5 for chromium amounts to about \$367.50 per shipload."

The following are the recalculated atomic weights according to the best authorities, compiled down to January 1, 1897:

	H = 1	O = 16
Aluminum	26.91	27.11
Antimony	119.52	120.43
Argon	(?)	(?)
Arsenic	74.44	75.01
Barium	136.39	137.43
Bismuth	206.54	208.11
Boron	10.86	10.95
Bromine	79.34	79.95
Cadmium	111.10	111.95
Calcium	39.76	40.07
Carbon	11.92	12.01
Cerium	139.10	140.20
Cæsium	131.89	132.89

	H = 1	O = 16
Chlorine	35'18	35'45
Chromium	51'74	52'14
Cobalt	58'49	58'93
Columbium	93'02	93'73
Copper	63'12	63'60
Erbium	165'06	166'32
Fluorine	18'91	19'06
Gadolinium	155'57	156'76
Gallium	69'38	69'91
Germanium	71'93	72'48
Glucinum	9'01	9'08
Gold	195'74	197'23
Helium	(?)	(?)
Hydrogen	1'000	1'008
Indium	112'99	113'85
Iodine	125'89	126'85
Iridium	191'66	193'12
Iron	55'60	56'02
Lanthanum	137'59	138'64
Lead	205'36	206'92
Lithium	6'97	7'03
Magnesium	24'10	24'28
Manganese	54'57	54'99
Mercury	198'49	200'00
Molybdenum	95'26	95'99
Neodymium	139'70	140'80
Nickel	58'24	58'69
Nitrogen	13'93	14'04
Osmium	189'55	190'99
Oxygen	15'88	16'00
Palladium	105'56	106'36
Phosphorus	30'79	31'02
Platinum	193'41	194'89
Potassium	38'82	39'11
Praseodymium	142'50	143'60
Rhodium	102'23	103'01
Rubidium	84'78	85'43
Ruthenium	100'91	101'68
Samarium	149'13	150'26
Scandium	43'78	44'12
Selenium	78'42	79'02
Silicon	28'18	28'40
Silver	107'11	107'92
Sodium	22'88	23'05
Strontium	86'95	87'61
Sulphur	31'83	32'07
Tantalum	181'45	182'84
Tellurium	126'52	127'49

	H = 1	O = 16
Terbium	158.80	160.00
Thallium	202.61	204.15
Thorium	230.87	232.63
Thulium	169.40	170.70
Tin	118.15	119.05
Titanium	47.79	48.15
Tungsten	183.43	184.83
Uranium	237.77	239.59
Vanadium	50.99	51.38
Ytterbium	171.88	173.19
Yttrium	88.35	89.02
Zinc	64.91	65.41
Zirconium	89.72	90.40

EDITORIAL.

NEW PROFESSORS IN THE PHILADELPHIA COLLEGE OF PHARMACY.

When it became necessary to fill the vacancy in the chair of Botany and Materia Medica in the College, caused by the death of Professor Bastin, it was decided by the Board of Trustees to create two new chairs in place of the old one. Dr. Clement B. Lowe, already an Instructor in the College, was accordingly nominated to occupy the chair of Materia Medica, and Professor Henry Kraemer, Professor of Botany, Pharmacognosy and Materia Medica in the Northwestern University, of Chicago, to fill the chair of Botany.

Both men are amply qualified, by education and experience, to fill the positions they have been selected to occupy. Dr. Lowe is a graduate of Bucknell University, of the Philadelphia College of Pharmacy and of the Jefferson Medical College. He conducted a pharmacy for a number of years, and has been Instructor and Quiz Master in the College for over ten years.

Professor Kraemer is a graduate of Girard College, of the Philadelphia College of Pharmacy, of the School of Mines, Columbia College, New York, and of the University of Marburg, Germany, where he received the degree of Doctor of Philosophy. His thesis for this degree was an elaborate study of *Viola tricolor*. He likewise had several years' experience in the retail drug business. In addition to his lectures on botany, Professor Kraemer will conduct the Botanical Laboratory so successfully organized by Professor Bastin.

Dr. J. L. D. Morison will become Instructor in Materia Medica, in addition to his present position as Assistant in the Botanical Laboratory.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

EINFÜHRUNG IN DAS STUDIUM DER ALKALOIDE, mit besonderer Berücksichtigung der vegetabilischen Alkaloide und der Ptomaine. Von Dr. Icilio Guareschi, O. Ö. Professor an der königl. Universität Turin, und Director des pharmaceutisch-chemischen und toxicologischen Instituts. Mit Genehmigung des Verfassers in deutscher Bearbeitung herausgegeben von Dr. Hermann Kunz-

Krause, Dozent für allgemeine und pharmaceutische Chemie an der Universität Lausanne. Zweite Hälfte, Berlin, 1897. R. Gaertner's Verlagsbuchhandlung, Hermann Heyfelder.

The first half of this valuable work was reviewed in this JOURNAL for February of this year. It may be well to repeat what was pointed out at that time, in regard to the sections into which the whole work is divided, viz.:

- I. Bases of the Open Chain Series.
- II. Bases of the Closed Chain Series.
- III. Metal Amines.
- IV. Alkaloids in the Narrower Sense.
- V. Ptomaines and Leucomaines.

The first half, in addition to the historical introduction, included all of the open chain series and a part of the closed chain series. The second half covers all the remaining sections, in addition to completing the consideration of the closed chain series. The fourth section is one of the most important in the whole work, since it very fully considers the natural alkaloids, their distribution in the vegetable kingdom, method of extraction, estimation, etc. It also contains a tabular list of the alkaloids, with their sources, according to natural orders, and their formulas; this section is also enriched by a number of paragraphs from the pen of the translator. As now completed, the book consists of 657 large pages, including an index. It is an indispensable work to every one who has to do with the alkaloids in any of their varieties.

REAGENTS AND REACTIONS known by the names of their authors. Based on the original collection by A. Schneider, revised and enlarged by Dr. Julius Altschul for the *Pharmaceutische Centralhalle*. Translated from the German by Richard Fischer, Instructor in Pharmacy at the University of Wisconsin. Pharmaceutical Review Publishing Company, Milwaukee, Wisconsin. 1897.

The difficulty experienced by many chemists in determining the nature of a reagent when, as is frequently the case, the name of the author only is given, is reason enough for issuing a work like this. The list as now published is very complete, and occupies 82 pages. There is an index of subjects given at the end which will materially assist locating certain tests. The pamphlet is well printed, and appears to be remarkably free from errors.

WARNER'S POCKET MEDICAL DICTIONARY OF TO-DAY, comprising the pronunciation and definition of 10,000 essential words and terms used in medicine and associated sciences. By William R. Warner. Philadelphia: William R. Warner & Co. 1897.

The foregoing title sufficiently explains the scope of this work. By omitting the very common terms, whose meaning is obvious or known to everybody, the author has been able to gain space and so keep the book down to his original intention, thereby making it strictly a pocket dictionary. It is a very complete list of words and their definitions, which are especially desired by both physician and pharmacist.

FORMALDEHYDE. By Eli Lilly & Co. Indianapolis. 1897.

This pamphlet is devoted to a description of the chemistry of formaldehyde, its use as a disinfectant, and its generation in the Moffatt Formaldehyde Lamp, which was fully described and illustrated in the April number of this JOURNAL.

THE PHARMACOLOGIST is the title of a quarterly journal devoted to *Materia Medica*, Pharmacy and Therapy. It is edited by F. E. Stewart, M.D., Ph.G., and published by Frederick Kimball Stearns, of Detroit, Mich. The first number, recently issued, is full of interesting matter. It contains comments and editorials on a variety of subjects, and two original communications, one on Aconite and another on Diastatic Ferments.

SEMI-ANNUAL REPORT OF SCHIMMEL & CO. (Fritzsche Brothers.) Leipzig and New York, April, 1897.

This number is superior in many respects to its predecessors. After the usual information in regard to a large number of oils, the following novelties are noted: Cardamom oil, Bengal Schinus (pepper-tree) oil; Valerian oil, Mexican; camphor-wood oil, Venezuelan; and golden-rod oil, Canadian.

The latter half of the Report is devoted to a list of essential oils, giving their botanical origin, the part or products of the plant from which the oil is obtained, the yield and the physical constants and principal chemical constituents of each oil. This is especially useful for reference. A map is appended, showing the producing districts of oil of peppermint (menthol) and camphor in Japan.

PROCEEDINGS OF THE TWENTIETH ANNUAL MEETING OF THE PHARMACEUTICAL ASSOCIATION OF THE STATE OF SOUTH CAROLINA.

The twentieth annual meeting of this association met in Columbia, S. C., November 11, 1896. A good number of original communications in the form of addresses were delivered.

STROPHANTHUS; A CLINICAL STUDY. By Reynold W. Wilcox, M.D., LL.D. From the *American Journal of the Medical Sciences*, May, 1897.

The author is of the opinion that the variety *Kombé* is a distinct species. The present report is confined to a clinical study of the tincture made from *Strophanthus Kombé*; the author reserves for another occasion the presentation of similar studies upon what he believes to be four absolutely independent species of *strophanthus*.

ZUR PRÜFUNG DES CHININS. Von O. Hesse, from *Archiv. der Pharm.*, 135 114, 1897. This is a subject on which Dr. Hesse is especially well fitted to speak.

NATURAL HISTORY CHARTS AND ILLUSTRATIONS. By John W. Harshberger, Ph.D. Reprinted from *Education*, April, 1897. Dr. Harshberger gives some valuable suggestions on the best means of conducting a short course on botany.

PHARMACEUTICAL ASSOCIATIONS.

PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

The twentieth annual meeting of this Association will be held in the Kittatinny Hotel, Delaware Water Gap, commencing Tuesday, June 22d, at 3.30 P.M.

The Delaware Water Gap is so delightfully situated, and so easily reached,

especially by members living in the eastern part of the State, that a large number will no doubt avail themselves of this opportunity for a few days' recreation and enjoyment.

The Trunk Line Association has granted permission to the railroads running to the place of meeting to sell tickets at a rate of two cents per mile. Orders for these tickets can be had on application to the Secretary, J. A. Miller, Harrisburg, Pa. The hotel will furnish entertainment at \$2.65 per day.

The Entertainment Committee will have a programme ready at the time of the meeting that will please everybody.

NEW YORK STATE PHARMACEUTICAL ASSOCIATION.

The nineteenth annual meeting of this Association will be held at Manhattan Beach, commencing Tuesday, July 13, 1897. The Committee on Pharmacy and Queries is very desirous of presenting a large number of papers on topics of scientific, technical and trade interest, and is making direct appeals to the members who have occasionally demonstrated their ability to prepare papers on subjects of interest to the pharmacists of the State. A list of queries has been prepared, which embodies suggestions that should appeal to every working pharmacist in the Association.

The meeting promises to be a splendid success so far as social features are concerned, and the Committee on Pharmacy and Queries is determined to make the pharmacy section of the meeting an interesting and valuable feature of it. With this object in view members are urged to select one or more subjects from the list of queries and prepare papers thereon. Albert H. Brundage, Ph.G., M.D., Chairman, 1153 Gates Avenue, Brooklyn, should be addressed on all matters relating to papers and queries.

THE ARKANSAS ASSOCIATION OF PHARMACISTS.

The Association met in annual session on May 11th, 12th, 13th, in Little Rock. The attendance was not large, but was very enthusiastic, and the meeting was a very entertaining and successful one. Ten new members were added to the list, which now numbers 175, consisting of many of the most influential pharmacists in the State.

President Sparks read his annual address, which was referred to a committee on distribution. The treasurer's report showed a balance on hand of \$293.91. The president appointed a committee of three, consisting of Dr. Bond, Mr. R. B. King and Dr. John W. Morton, to convey the fraternal greetings of the Association to the Arkansas Medical Society, which was in session in this city.

During the session a number of interesting papers were read, among which were the "Future Supply of Coal," by Mr. R. B. King, of Helena. This paper, which shows that there can be no dearth in the coal supply of the world, was referred to the Committee on Publication. Mr. Ginnochio treated the "Influence of Moisture on Drugs" very instructively.

The report of the Secretary of the Arkansas Board of Pharmacy was read by Dr. Bond. It showed a registration of 28 during the last year, and a total registration of 921. Graduates of reputable Colleges of Pharmacy and licentiates of some of the State Boards are occasionally recognized by our Board.

The query box afforded much interesting and instructive discussion.

A display of chemicals made by Mr. Germain, of Fort Smith, attracted much attention, particularly the dry chemicals. The prize for Pharmaceutical display was awarded to him.

The special committee appointed to convey the fraternal greetings of this body to the Medical Society reported they had been received in a very cordial manner, and invited to address that body, which invitation was accepted, and much gratification was expressed by the physicians for the visit and the address.

The following gentlemen were elected officers for the ensuing year :

Mr. J. F. Dowdy, Little Rock, President.

Dr. H. C. Johnson, Van Buren, First Vice-President.

Dr. J. W. Morton, Fort Smith, Second Vice-President.

Mr. John B. Bond, Jr., Little Rock, Secretary. Re-elected.

Mr. J. A. Jungkind, Little Rock, Treasurer. Re-elected.

Mr. Dowdy, being elected president, made a vacancy in the Executive Committee, which was filled by the election of Mr. Shachleiter.

After some discussion, it was agreed that the next meeting should be held in Little Rock on the second Tuesday in May, 1898.

On motion of Dr. Bond, it was ordered that the president, secretary and treasurer should compose the Publication Committee.

No further business appearing, the new officers were severally installed, and the meeting adjourned.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, May 18, 1897.

The last Pharmaceutical Meeting of the present series was held in the Museum of the College at 3.30 P.M. Mr. F. W. E. Stedem presided. The reading of the minutes of the previous meeting was omitted.

An interesting paper on "Yerba del Pollo," by Prof. Alfonso Herrera, of Mexico, was read by Prof. Henry Trimble (see page 290).

The usefulness of this plant as a remedy in medical practice, and as affirmed by the writer, dates back to the time of the Aztecs, it having been employed by them in the treatment of several diseases. But when their power was overcome it was forgotten, together with other useful products of their country. Nearly three centuries elapsed before it again attracted the attention of investigators, and it has been only within the latter half of this century that any considerable study has been given to it. It is valued chiefly as a hemostatic, although, as stated by the writer, there seems to be some difficulty in determining to what constituent this property is due.

"On the Occurrence of Strontium in Plants" was the subject of a somewhat timely paper presented by Prof. Henry Trimble (see page 296).

The author had discovered strontium in a number of samples of bark from different species of *Castanopsis* growing at Singapore, India, while a sample of American *Castanopsis* growing in California gave no indication of the presence of this metal. Two samples of oak and one of mangrove from India also contained strontium. A comparison of the data so obtained led the writer to believe that the presence of strontium salts in the samples from Singapore was due to the composition of the soil in that country.

Prof. Samuel P. Sadtler referred to the use of strontium hydrate in sugar refining, and to the objectionable feature of its cost when first suggested for this purpose, on account of the limited supply of the minerals of strontium. The discovery of other mines since then had had their influence in decreasing the cost of the metal, and in regard to its occurrence in India he thought it probable that the government or mining reports would give some information.

Professor Trimble replied that the government officials reported only a trace of strontium salts in the Singapore soil.

A paper, entitled a "Note on Red Mercuric Oxide," was contributed by Mr. J. W. England (see page 311). This was intended as a reply to the criticisms presented by Mr. Charles H. LaWall, at the meeting last month, on citrine ointment. The principal remarks of the author were on the question of the relative purity of red mercuric oxide and metallic mercury, and the advisability of substituting the former for the latter in the formula for citrine ointment, as a matter of convenience. His information in regard to the purity of these substances did not accord with Mr. LaWall's statement concerning them, and in evidence of this, extracts from letters from three firms of manufacturing chemists were presented.

Mr. Lyman F. Kebler casually made reference to a subject which had recently been brought to his notice. He said that a resinous substance, which had been applied to the trunks of some of the trees in the public squares of this city to serve as an obstruction to insects, had been found to be harmful to the trees. In experimenting with solvents with the object of removing it, he found acetone to answer the purpose most effectually.

Some specimens and other objects added to the interest of the meeting as follows :

A curious specimen of a growing plant of Japanese cultivation was loaned by Mr. Howard B. French. It belonged to the natural order Coniferae, and in outline strikingly resembled a fowl, the fictitious name "Ibis firma" being significant of this.

A copy of letters patent, which was an elaborate and formidable document, granted during the reign of George II of England, for a medicine "Oleum Anodinum," was presented by Mr. Chas. Bullock.

Professor Trimble called attention to a large specimen of canaigre root, showing the influence of cultivation, and to one of natural growth, much smaller in size, both of them having grown at Rialto, California.

Among the samples was one of calcium carbide, presented by Mr. J. O. McHenry, of this city.

An improved attachment for the "Moffatt Formaldehyde Generator," presented by the agents, Messrs. Eli Lilly & Co., of Indianapolis, Ind., was exhibited.

The chairman believed in the efficacy of the apparatus as a disinfecting agent, but said that, in order to insure the generation of the gas, it was necessary to carefully adjust the wick.

On motion, the meeting adjourned.

THOS. S. WIEGAND, *Registrar.*